



INVITED COMMENTARY

## Comments regarding 'Ultrasound Measurement of Aortic Diameter in a National Screening Programme'

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Clinical and scientific decisions and conclusions on aortic diseases are based on the aortic diameter and its changes over time. Although ultrasound (US) is an excellent technique for this purpose, its accuracy is still only within a range of about  $\pm 5$  mm. With the introduction of large-scale screening programmes for abdominal aortic aneurysm (AAA), the importance of this limitation has become evident. With half of all AAAs detected by screening ranging from 30 to 35 mm and an even greater number of aortas in the range of 25–29 mm, this limitation is not trivial. A difference of a few millimetres may have a significant impact on the individual patient as well as on epidemiological data.<sup>1</sup>

The methodology of abdominal aortic diameter measurement by means of US has, so far, been restricted to include a measurement of the antero-posterior diameter with the US-transducer perpendicular to the bloodflow. There is, however, no agreement on how this diameter should be defined, and, in most reports, this is not even discussed.

In this issue of EJVES, Hartshorne et al. present a study on the reproducibility of aortic diameter measurements by means of inner to inner (ITI) and outer to outer (OTO), the two most commonly used definitions.<sup>2</sup> Such an analysis is long overdue and needed and the authors are to be congratulated upon an important and well-performed study. The main finding that ITI has a better

reproducibility than OTO and is to be preferred will most likely have a significant and immediate impact on ongoing screening and surveillance programmes and in clinical practice. However, more work needs to be done.

The most distinctive US reflection (echo) is obtained at boundaries between an echo-lucent and an echo-dense layer (leading edge) as opposed to when the sound passes from an echo-dense to an echo-lucent layer (far edge). Thus, aortic measurements from the outer anterior wall to the inner posterior wall (leading edge to leading edge) may have some theoretical advantages over ITI.<sup>3</sup> Whether the reproducibility improves with the leading-edge-to-leading-edge method needs to be confirmed.

An additional issue, yet to be resolved, is where exactly to place the calliper in the posterior wall. With a resolution of about 2 mm, a thin intima-media complex may be difficult to identify, and, in cases of concomitant atherosclerotic disease, it can be questioned whether a diseased, thickened intima should be used as a boundary. The anterior margin of the adventitial layer, which often corresponds to the first strong US echo in the back wall, may therefore be a more suitable posterior boundary of the aortic diameter.

With most patients susceptible to an erroneous clinical decision, due to methodological inaccuracy, the generally accepted threshold diameter of 30 mm for follow-up can be questioned. In addition, several reports indicate that an aorta between 25 and 29 mm should be classified as an "aneurysm in formation."<sup>4</sup> The consequences of rescanning this subgroup, for example, after 5 years, therefore need to be investigated in prospective studies.

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